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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET UNIVERSITY)

M.Sc. (Second Semester - Regular) Examinations, July - 2025

21MCYPC12002 – Inorganic Chemistry-II

(Chemistry)

The figures in the right hand margin indicate marks PART - A Q.1. Answer ALL questions Calculate the effective atomic number of a single metal atom Fe (CO) ₁₂ , Mn ₂ (CO) ₁₀ CO3 K2	Time: 3 hrs	Maxim	Maximum: 60 Marks			
Answer ALL questions Calculate the effective atomic number of a single metal atom Fe (CO) ₁₂ , Mn ₂ (CO) ₁₀ CO3 K2		-				
Fe (CO) ₁₂ , Mn ₂ (CO) ₁₀ b. Determine the structure of Ru ₆ C(CO) ₁₇ c. What is kinetics stability? d. Write a note on remote attack. e. Define transition metal carbene. PART – B Answer ALL the questions (a) Co ₄ (CO) ₁₂ (b) Fe ₃ (CO) ₁₂ (c) Ir ₄ (CO) ₁₂ 2. a. Calculation of Metal-Metal bond and structure of the following complexes (a) Co ₄ (CO) ₁₂ (b) Fe ₃ (CO) ₁₂ (c) Ir ₄ (CO) ₁₂ b. Identify the 18 electron species.		$(2 \times 5 =$		Blooms		
CO Second CO CO CO CO CO CO CO C	_		CO3	К2		
CO Filine transition metal carbene. CO CO CO PART - B CO CO CO CO Part - B CO CO CO CO CO CO Part - B CO CO CO CO CO CO CO			CO3	K2		
PART - B	· · · ·		CO1	K1		
PARSWET AIL the questions (a) Calculation of Metal-Metal bond and structure of the following complexes (a) Co4 (CO1)2 (b) Fe3 (CO1)2 (c) Ir4 (CO1)2 A Co1 (CO1)2 (b) Fe3 (CO1)2 (c) Ir4 (CO1)2 B. Identify the 18 electron species. 4 CO3 R8 β ⁵ Carls Fe (CO)2 Cl, η³ Cash γ fo Cash γ Fe CO TOR 10 CO2 R1 8. Write the preparation, properties and structure of Fe (CO)3 10 CO2 K1 9. Write down the preparation properties of Carbides. 6 CO2 K1 10. Determine the structure of heteroboranes (C2B7H13) and (C2B2H3) 4 CO4 CO4 10. Explain different Kinetics of octahedral substitution. 10 CO5 K1 11. Glassify the following complex ions as inert or labile and how? [Ti(H2O)a) ²⁺ , [Co(H2O)a) ³⁺ and [PtCla] ²⁻ 6 CO4 CO4 12. Glassify the following complex ions as inert or labile and how? [Ti(H2O)a) ²⁺ , [Co(H2O)a) ³⁺ and [PtCla] ²⁻ 4 CO2 K1 13. Glassify the following complex ions as inert or labile and how? [Ti(H2O)a) ²⁺ , [Co(H2O)a) ³⁺ and [PtCla] ²⁻ 4 CO2 CO3 K2 15. Discuss different types of stability constants of complexes. [Ti(H2O)a) ²⁺ and [PtCla] ²⁻ 6 CO4 </td <td>•</td> <td></td> <td>C02</td> <td>K1</td>	•		C02	K1		
Answer ALL the questions 2. a. Calculation of Metal-Metal bond and structure of the following complexes (a) Co4 (CO) ₁₂ (b) Fe ₃ (CO) ₁₂ (c) Ir ₄ (CO) ₁₂ b. Identify the 18 electron species. η ⁵ - C ₆ H ₅ Fe (CO) ₂ Cl, η ³ -C ₅ H ₅ η ⁵ -C ₅ H ₅ Fe CO (OR) c. Write the preparation, properties and structure of Fe (CO) ₅ 3.a. Write down the preparation properties of Carbides. μο Determine the structure of heteroboranes (C ₂ B ₇ H ₁₃) and (C ₂ B ₂ H ₆) μο Determine the structure of heteroboranes (C ₂ B ₇ H ₁₃) and (C ₂ B ₂ H ₆) μο Cost (COR) c. Explain different Kinetics of octahedral substitution. (OR) c. Explain different Kinetics of octahedral substitution. 10 CO5 K2 4.a. Classify the following complex ions as inert or labile and how? [Ti(H ₂ O) ₆] ²⁺ , [Co(H ₂ O) ₆] ³⁺ and [PtCl ₆] ²⁻ b. Write down the preparation of carboranes. (OR) c. Explain evidences in favour of conjugate base mechanism. 10 CO4 K2 5.a. Discuss different types of stability constants of complexes. (OR) b. Classify different types of stability constants of complexes. (OR) b. Classify different types of transition metal carbene and explain synthesis of carbine complex 6.a. Write notes on the following: (a) Chelate effect (b) Steric effect b. Citting an example discuss the Inner sphere mechanism of electron transfer reaction. (OR) c. Explain difference between singlet carbene and triplet carbene. (OR) c. Explain difference between singlet carbene and triplet carbene. 6 CO3 K2 d. Find out the product A and B and draw the structure [PtCl ₄] ²⁻ +NH ₃ A +NH ₃ B	e. Define transition metal carbene.		CO1	K2		
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(a) CO_4 (CO_{112} (b) Fe_3 (CO_{112} (c) Ir_4 (CO_{112}) b. Identify the 18 electron species. $\dot{\eta}^5$ - C_6H_3Fe (CO_{2} CI, $\dot{\eta}^3$ - C_3H_5 $\dot{\eta}^5$ - C_5H_5 Fe CO (OR) c. Write the preparation, properties and structure of Fe (CO_{5} 10 CO2 K1 3.a. Write down the preparation properties of Carbides. 6 CO2 K1 b. Determine the structure of heteroboranes ($C_2B_7H_{13}$) and ($C_2B_2H_6$) 4 CO4 K2 (OR) c. Explain different Kinetics of octahedral substitution. 10 CO5 K2 4.a. Classify the following complex ions as inert or labile and how? [Ti($H_2O)_6$] ²⁺ , $[Co(H_2O)_6]^{3+}$ and $[PtCl_6]^{2-}$ b. Write down the preparation of carboranes. (OR) c. Explain evidences in favour of conjugate base mechanism. 10 CO4 K2 5.a. Discuss different types of stability constants of complexes. 6 CO4 K3 (OR) b. Classify different types of transition metal carbene and explain synthesis of carbine complex (a) Chelate effect (b) Steric effect b. Citing an example discuss the Inner sphere mechanism of electron transfer reaction. (OR) c. Explain difference between singlet carbene and triplet carbene . 6 CO3 K2 d. Find out the product A and B and draw the structure [PtCl_4] ²⁻ +NH3 A +NH3 B	Answer ALL the questions	Marks		Blooms		
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d. Find out the product A and B and draw the structure [PtCl ₄] ²⁻ +NH ₃ A +NH ₃ B 4 CO5 K3	· /	6	CO3	K2		
$[PlCl4] \xrightarrow{+N\Pi3} B$	d. Find out the product A and B and draw the structure					
HMA OT DOMON	$\begin{array}{c} \text{Frc14} & +\text{NH3} & \text{A} & +\text{NH3} & \text{D} \\ & & & - \text{ Fnd of Paner} - \end{array}$					